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COMPOUND OBJECTIVE LENS [HAVING TWO FOCAL POINTS, IMAGING OPTICAL SYSTEM FOR CONVERGINGIN LIGHT WITH THE COMPOUND OBJECTIVE LENS, OPTICAL HEAD APPARATUS FOR RECORDING OR REPRODUCING INFORMATION WITH THE IMAGING OPTICAL SYSTEM,] FOR OPTICAL [DISK] DISKS HAVING [TWO TYPES OF RECORDING] DIFFERENT THICKNESSES

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of U.S. Pat. application Ser. No. 08/190,520, filed Feb. 1, 1994 now U.S.

5 Pat. No. 5,446,565.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a compound objective lens composed of an objective lens and a hologram lens which has two focal points, an imaging optical system for converging light on two converging spots placed at different depths of an information medium with the compound objective lens, an optical head apparatus for recording, reproducing or erasing information on or from an information medium such as an optical medium or a magneto-optical medium like an optical disk or an optical card with the imaging optical system, an optical disk in which a series of high density recording pits and a series of comparatively low density recording pits are provided, an optical disk apparatus for recording or reproducing information on or from the optical disk with the compound objective lens, a binary focus microscope having two focal points in which two types of images drawn at different depths are simultaneously observed, and an alignment apparatus for aligning two types of images drawn at different depths with the binary focus microscope.

2. Description of the Related Art

An optical memory technique has been put to practical use to manufacture an optical disk in which a pit pattern formed of a series of pits is drawn to record information. The optical disk is utilized as a high density and large capacity of information medium. For example, the optical disk is utilized for a digital audio disk, a video disk, a document file disk, and a data filed disk. To record information on the optical disk and to reproduce the information from the optical disk, a light beam radiated from a light source is minutely converged in an imaging optical system, and the light beam minutely converged is radiated to the optical disk through the imaging optical system. Therefore, the light beam is required to be reliably controlled in the imaging optical system with high accuracy.

The imaging optical system is utilized for an optical head apparatus in which a detecting system is additionally provided to detect the intensity of the light beam reflected from the optical disk. Fundamental functions of the optical head apparatus are classified into a converging performance for minutely converging a light beam to form a diffraction-limited micro-spot of the light beam radiated on the optical disk, a focus control in a focus servo system, a tracking control in a tracking serve system, and the detection of pit signals (or information signals) obtained by radiating the light beam on a pit pattern of the optical disk. The fundamental function of the optical head apparatus is determined by the combination of optical sub-systems and a photovoltaic transfer detecting process according to a purpose and a use. Specifically, an optical head apparatus in which a holographic optical element (or hologram) is utilized to minimize and thin the optical head apparatus has been recently proposed.

60 2.1. Previously Proposed Art

Fig. 1 is a constitutional view of a conventional optical head apparatus proposed in Japanese Patent Application No. 46630 of 1991 which is applied by inventors of the present invention.